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Forty Years of Education

In an article on "A Philosophy of Agriculture" in the March issue of *The Scientific Monthly*, Dr. Pei-sung Tang stated that the production of agricultural products in China costs more than ten times as many man-hours of labor as in the United States. The difference is due to the fact that the Chinese still use the methods of their ancestors, while in this country agriculture has become to a considerable extent mechanized.

However, in the fields of transportation and industry the increase in productivity per man, due to science and technology, is much greater than in agriculture. For example, in this country the average cost to the shipper of sending a ton of freight one mile by railroad is less than one cent, or barely the wages of an unskilled laborer for one minute. The average amount of freight shipped on steam railroads per year per person has risen to the astonishing level of 2500 tons for one mile.

One more illustration of technological economies in production will suffice for present purposes. The average cost to the consumer of electric energy in the United States, always available for use at the convenience of the purchaser, is less than 1.5 cents per horsepower-hour. Its low cost is no more remarkable than its easy transmissibility, the extraordinary variety of its uses and its unparalleled convenience. It may be derived from falling water or burning coal and transmitted silently and invisibly perhaps a hundred miles over a slender wire and then used to drive a dentist's drill or haul a hundred railway cars, to light a surgeon's tiny lamp or heat an electric furnace. Fifty times more mechanical work is being done in the United States by electricity than by all the many millions of human beings and domestic animals. Three quarters of this development has taken place since 1920 and absolutely all of it within the memory of many men still living.

It would be an error to marvel at the economies of railroad transportation and the use of electric energy and other technological developments without looking beyond to their social consequences. This further view is the purpose of these comments. Only one social consequence of the immense economies of the transportation of freight on steam railroads and of electrical developments and other technologies will be considered now, namely, its quantitative effects upon American education during the forty years from 1900 to 1940.

ELEMENTARY AND SECONDARY PUBLIC SCHOOLS

	1900	*1920*	*1940*
Percentage of school-age population	72	78	85
Average number of days	144	162	175
Average days in attendance	99	121	152
Operations cost per pupil	$14	$48	$92
Cost per capita of population	3	10	18
Average salary of teachers	325	871	1,441
Total expenditure (millions)	215	1,036	2,334

On taking into account the increase in the percentage of population of school age (5–17 yrs.) enrolled and the average days in attendance, one finds that the effective attendance in elementary and secondary public schools increased more than 81 percent in 40 years. In the same interval the operating costs per pupil enrolled and per capita of population increased six fold. This increase in operating expenses of public schools occurred in every section of the country at approximately the same rate, though the absolute expenditures were by far the greatest in the large centers of population where all costs are highest.

The most obvious measure of the results of the great increase in educational opportunities in the interval from 1900 to 1940 is the number of graduates. For the secondary schools, both public and private, the data are as follows:

PUBLIC AND PRIVATE SECONDARY SCHOOLS

	1900	1920	1940
Total enrollment	696,000	2,496,000	7,113,000
Percentage of population	1.0	2.4	5.4
Total graduated in year	95,000	311,000	1,228,000
Percentage graduated	13.7	12.4	17.2
Men graduated	38,000	124,000	578,000
Women graduated	57,000	188,000	650,000
Percentage men to women	66.6	66.0	88.9

It follows from the second line of this table that the percentage of the total population enrolled in secondary schools increased five fold in forty years. Furthermore, the percentage of those enrolled who graduated increased by twenty-five percent in the interval, the increase being greatest among the men.

The record for institutions of higher education is generally parallel to that for secondary schools, as shown in the following table:

INSTITUTIONS OF HIGHER EDUCATION

	1900	1920	1940
Total enrollment	238,000	598,000	1,493,000
Teachers colleges	69,600	135,400	177,000
Liberal arts and professional	168,000	463,000	1,316,000
Factor of increase from 1900		2.8	7.9
Increase of population from 1900		1.4	1.7

In the interval from 1900 to 1940 college, university and professional school enrollments increased 4.6 times as fast as the entire population of the country.

The foregoing data briefly outline the enormous expansion in formal education that science and its applications made possible in a brief instant in human history. If our predecessors could have foreseen its coming they probably would have rejoiced that a period of wisdom and goodness and happiness was about to arrive. But at this very hour we tremble for the future of civilization.—F.R.M.

Democracy in Science

For more than three years a committee, under the chairmanship of Dr. Burton E. Livingston, has been preparing a new constitution for the Association which will be submitted to the Executive Committee in the near future for its consideration. The undertaking of this task has naturally required a review of the history of American science and given rise to reflections on the role the Association should play in the future.

Since the Association was founded in 1848, it is not quite 100 years of age. Yet it was the first enduring American scientific society on a national scale. With an initial membership of 461, it began operations under "Objects and Rules of the Association," which became its constitution in 1851. In 1874 the constitution was completely revised and the Association was incorporated under the laws of the Commonwealth of Massachusetts. Aside from a number of amendments, the constitution of 1874 remained in effect until 1920, a period of 46 years, and it has had no thorough revision from 1920 until the present time, an interval of 24 years.

There are now scores of national scientific societies in the United States, most of which have been established within the memory of men still living. For example, the American Chemical Society was organized in 1876; the Botanical Society of America and the American Mathematical Society in 1894; the American Physical Society in 1899; and the American Society of Zoologists in 1903. Even though some of these societies grew out of earlier ones of brief existence, they all are of surprisingly recent origin. With the rapid development of these large special societies, science became more and more subdivided. There have been important advantages in this progressive specialization, and some obvious disadvantages. Throughout these decades the Association has provided opportunities, in its great meetings, for scientists from different fields and memberships in many different societies to mingle with one another and enjoy the stimulating effects of cross fertilization of ideas.

There appear to be two principal important functions of the Association in the near future, as there have been in the recent past. One is to keep ever before scientists the fact that science as a whole is much greater and richer than any of its parts, and that extreme specialization and isolation will in time lead to sterility and decline. The other is to emphasize the obligations of scientists to society and, reciprocally, to make clear to the intelligent public how greatly society depends upon science. And more important than either, and perhaps the highest mission the Association can have, may well be to hold up the intellectual integrity characteristic of science at its best as the only sure way to happiness in this world. But the present discussion must be limited to considerations relevant to the constitution of the Association which is under preparation.

A well-written constitution states an end or a purpose to be accomplished and prescribes rules for attaining it. For example, the Constitution of the United States was adopted for such purposes as to establish justice, promote the general welfare, and to secure the blessings of liberty to

those who accepted it and to their posterity. The sole purpose of the Association is "to advance science." The existing constitution and the proposed new constitution define how it is to be done, but the chief purpose of the present discussion is to describe the Association as a democratic federation of all the natural and social sciences. With these general remarks as a background, the bearings of the provisions of the new constitution, which will be published in *Science* after it has been accepted by the Executive Committee, will be more easily understood.

The control of the affairs of the Association is explicitly placed in the Council. The Council consists of the administrative officers, a representative of the Pacific Division and of the Southwestern Division, the 15 vice presidents, the 15 secretaries of the sections, and eight elected members of the Executive Committee, a total of 43 representing the Association; and, in addition, 168 representatives of the affiliated and associated societies and 35 representatives of the affiliated academies of science, a present total of 203 members of the Council elected by wholly independent societies and academies. Consequently, of 246 members of the supreme governing body of the Association, only 14 percent will be elected by the Association itself; the remaining 86 percent will be elected by other members of the federation of scientific societies that together make the voice of the Association in a real sense the voice of American science.

Although the establishing of policies of the Association and the election of its general officers are exclusive functions of the Council, the appointment of administrative officers and the control of the details of operations are necessarily vested in a smaller executive committee elected by the Council. Under the terms of the tentative draft of the new constitution, the Executive Committee will consist of 13 members, the President-elect, the President, the Retiring President, the Administrative Secretary, the General Secretary and eight Fellows of the Association, two to be elected each year for a term of four years. It will be noted that the Executive Committee will have a considerable degree of continuity because each man elected as president serves on the Committee three years, and the term of office of the eight elected members is four years. However, no dynasty can develop because a new president-elect becomes a member each year, and, under the proposed new constitution, not more than one of the two elected members retiring each year may succeed himself.

The August Scientific Monthly

The August issue of *The Scientific Monthly* is notable for the publication in Spanish of a fascinating article by Dr. Enrique Beltrán, Professor of Zoology in the University of Mexico. Dr. Beltrán describes a protozoan infection of the skin of chicle collectors, who contract the disease in the jungles of Yucatán. An English translation of the article is published on left-hand pages and the original Spanish appears on adjacent right-hand pages. The illustrations are distributed among the Spanish and English texts.

The leading article is a reprint of an address which Dr. A. J. Carlson, President of the American Association for the Advancement of Science, delivered in 1931. It is republished to remind some and to inform others of his views on science and the supernatural. Mr. Clarence S. Jarvis, an engineer, points out that the discharge of water by the rivers of the world depends on precipitation in the drainage basin of each river and on many other factors, particularly rate of evaporation and transpiration. Continuing his story of the trees of South Florida, Dr. John C. Gifford describes five native trees that yield cabinet woods.

The earliest winged fish-catchers were winged reptiles and toothed birds, which are thoroughly described and illustrated by Dr. Gudger. Admiral Furer throws some light on the necessity for red tape in wartime. For those who are philosophically minded, Professor Bergmann offers an analysis of empiricism and science. The U. S. Department of Agriculture is the source of two articles: one attempts to allay fears that lean years of production of staple crops may lie ahead; the other demonstrates that it is worth while to try to prevent foreign plant diseases from entering this country through ordinary channels of commerce.

Contents

Notes on the Cleveland Meeting

In spite of the many uncertainties of these times, progress is being made in the preparation of very good programs at the Cleveland meeting September 11–16.

Dr. Isaiah Bowman's address as retiring president of the Association is scheduled for Monday evening, September 11. Dr. Bowman has returned from his conferences in London and reports that his address has been written.

On Tuesday evening the annual Sigma Xi address will be delivered by Edwin J. Cohn, of the Harvard Medical School, on "Blood and Blood Derivatives," a subject of the highest medical importance, especially during the war period, to which he has recently made far-reaching contributions.

On Wednesday evening the annual Phi Beta Kappa address will be delivered by Dr. Harlow Shapley, Director of Harvard College Observatory.

For Thursday evening arrangements have been completed for an illustrated lecture on the National Geographic Society-Smithsonian Institution Archeological Expeditions to Southern Mexico by Dr. Matthew W. Stirling, Chief of the Bureau of American Ethnology, and leader of the expeditions, and Mrs. Stirling.

Several important symposia are being organized on various phases of international cooperation in science after the war by Dr. Gardner Murphy, professor of psychology in the College of the City of New York, Lawrence K. Frank, chairman of the Association's Committee on Science and Society, and Dr. Howard R. Tolley, Chief of Bureau of Agricultural Economics of the Department of Agriculture. Mr. Frank is also organizing a symposium on "Research after the War: The Need for a National Policy on Research."

As to the programs by the sections of the Association, the Section on Chemistry will hold four sessions. The Section on Geology and Geography is preparing a comprehensive symposium on quartz, the demand for which has enormously increased during the war, and the post-war uses of which promise to be many and important. Scientists in various government agencies, in industry and in private institutions are cooperating in the development of the program. The section will also have two sessions on recent geological research in the Eastern Interior Region; another will be devoted to Quaternary geology, which will include an address by Dr. M. M. Leighton, Chief of the Illinois Geological Survey, on "Present Knowledge and Problems Concerning Glacial History of Illinois." The session of the Section on Botanical Sciences (G) will be devoted to the addresses of retiring vice presidents, Dr. G. M. Smith, Stanford University, Dr. W. J. Robbins, New York Botanical Garden, and R. E. Cleland, Indiana University. This session will be held on Tuesday afternoon. The Section on Agriculture (O) is preparing a symposium on "Nutrition" to be held jointly with the Section on Botanical Sciences (G). There will be three papers, one each by a microbiologist, a plant breeder, and a plant physiologist.

The Section on the History and Philosophy of Science (L) is organizing a symposium on "Trends in Scientific Research." One of the features of these programs will be a paper by Dr. W. A. Shewhart, of the Bell Telephone Laboratories, on statistical control.

Changes in Hotel Headquarters

Due to the fact that the Allerton Hotel has been taken over by the U. S. Navy to house WAVES, the Association is deprived of the use of this hotel for rooming accommodations and for meetings. It was necessary, therefore, to find other hotel headquarters for the Ecological Society of America and the Genetics Society of America. These societies have been assigned to the Hotel Statler.

A Very Difficult Decision

Two years ago, on request of the Director of the Office of Defense Transportation, the annual meeting of the Association and its affiliated societies was cancelled about four weeks before it was scheduled to be held. The holding of a meeting in 1943 was not even contemplated. During these two years most of the large biological groups felt very keenly the lack of opportunities for conferences with one another. With the exception of the geologists, most groups in the physical sciences have continued to hold at least regional meetings. Last February the Association and the affiliated societies which usually meet with it carefully considered the whole problem of the duty of scientists in their respective fields to the war efforts of this country and their responsibilities to society in an even broader sense. At that time a meeting at Cleveland was scheduled for September 11–16 with the full knowledge that unpredictable developments might require it to be severely reduced to essentials. A program of high quality is well under way.

At this stage of developments, an urgent request has been received from the ODT to cancel the Cleveland meeting on the ground that "the carriers will soon be faced with the problem of transporting comfortably and quickly, from ocean ports to military hospitals, our wounded Service personnel, who will be evacuated from the theaters of war." If such demands for space on passenger trains should develop to any considerable extent, no civilian scientist should or would travel at all.

However, the problem of railway passenger travel is not one that can be adequately presented in a sentence or two or by an appeal to emotions. It is one to be determined from statistics of travel relative to available facilities. Railway travel has increased at an enormous rate during the past three years, while locomotives and passenger cars have not been produced in sufficient numbers to replace those that have gone out of service. Limiting the figures to the railroads over which our wounded from Europe will be transported, the average numbers of passengers carried daily on steam railroads of the Eastern District had been as follows: 1941, 960,000; 1942, 1,130,000; 1943, 1,640,000. That is, the passenger travel on the steam railroads increased from a daily average of 960,000 in 1941 to 1,640,000 in 1943, or by 71 percent. These figures explain the difficulties in which the railroads are involved. The simple fact is that reduced automobile travel and an abundance of spending money have very greatly increased civilian travel on railroads, for only a small part of the increase of 680,000 passengers per day between 1941 and 1943 can be accounted for by increased travel of service men.

As a practical matter it is impossible effectively to control railroad travel by civilians. The railroads themselves are not responsible for their present difficulties, for statistics of both freight and passenger traffic prove that they are being operated with extraordinary efficiency. Consequently ODT, in its problem of keeping the wheels of railroads turning in our war effort, apparently has no recourse except to appeal to scientists and other patriotic citizens to travel only for purposes directly connected with the war.

There is evidently no completely satisfactory solution to the problem respecting the Cleveland meeting which the Association and its affiliated societies must face. There is no course they can follow which cannot be justly questioned from one point of view or another. The officers of the Association have taken all these matters into account, and have taken even wider horizons under consideration in order to arrive at a decision that will be of the greatest advantage, not to themselves alone, but to the future of science and civilization. They, of course, are not unmindful that the Association has several hundred members in Cleveland, and more members in Ohio than its total membership at any time during its first thirty years. They are aware that their principal addresses can be broadcast throughout the country. The great daily papers, as usual, will carry reports of addresses and scientific achievements of wide public interest. Consequently, even though conditions in September make it necessary to reduce travel to the very limit, by the decision to hold a meeting in Cleveland, science in general will, for the first time in three years, be able to make its voice heard by the American public. As all the world knows, science has been essential to winning the war; as the world will learn, it will be equally essential for a happy future.

National Science Teachers Association

Dr. Philip G. Johnson, of Cornell University, has announced the formation of the National Science Teachers Association of which he is "president *pro tem*," to hold office until the organization is completed. The purpose of the new society is "to stimulate, improve and coordinate science teaching at elementary, secondary and collegiate levels of instruction."

There have been two associations of science teachers, the American Science Teachers Association and the American Council of Science Teachers. The former has been an associated society of, and has met with, the American Association for the Advancement of Science since 1936; the latter has been a department of the National Education Association. The officers and directors of both of these societies have voted unanimously to merge in the new organization. Naturally the launching of such an undertaking presents many problems.

In the Handbook of Scientific and Technical Societies and Institutions of the United States and Canada, published by the National Research Council, there are brief sketches of 1,269 scientific and technical societies and institutions in the United States and 143 in Canada. With so many scientific societies and institutions already in existence, when a new one is proposed the question of the need for it always arises. In the present instance there is the ready answer that

the new society will take the place of two previously existing societies. But the problem is too important to be dismissed on such grounds.

Before considering the desirability of new societies, it should be noted that a considerable fraction of the 1,269 scientific societies and institutions in the United States and of the 143 in Canada are local in a very real and proper sense. For example, the Illinois State Academy of Science functions locally in comparison with the whole country, but clearly its existence does not imply that there should not be similar academies in Indiana, Kentucky, Iowa and other states, as there are. The real question is whether local societies serve a useful purpose that cannot be done so satisfactorily in any other way. On the basis of this criterion, it is doubtful that any one familiar with the work of the state academies of science would question their desirability. Their programs often compare favorably with the programs of the leading national societies of 50 years ago. Scores of other scientific organizations are listed in the Handbook whose memberships and activities are local in the narrower sense of being within the limits of their respective cities. An illustration is the Philadelphia Botanical Club. In addition to the local societies listed in the Handbook there are hundreds of others. Their continued existence proves they are useful.

Among the 1,269 societies and institutions listed in the Handbook there are many whose fields of interest are very limited, as, for example, the American Rock Garden Society and American Bison Society. It is probable that most, perhaps all, of these societies, whose interests are limited to special fields, are useful. Their successful existence is no reason why societies should not be organized to advance the interests of science and its applications in other fields in which there are no special societies.

In addition to the foregoing, there are foundations, institutes and scientific fraternal societies, such as the Rockefeller Foundation, Woods Hole Oceanographic Institution, Science Service, the Franklin Institute, and the Society of the Sigma Xi. The truly national society, whether devoted to broad fields of science in general or to such varied subjects as chemistry, are relatively not very numerous. An examination of the National Research Council Handbook reveals 127 societies in the fields of the natural and social sciences which appear to be national in character, not narrowly limited in scope, operated for the advancement of science, and having more than 500 members. There were, however, so many doubtful cases that the number might have been increased or decreased by 25 without seriously violating the judgment.

The new National Science Teachers Association is national geographically, as broad as science in its interests, has for its purpose the fundamental problem of improving teaching of science, and it is expected by the organizers that it will eventually have 25,000 members. Apparently its program must include not only the announced purpose "to stimulate, improve and coordinate science teaching at elementary, secondary and collegiate levels of instruction," but also a searching examination of the place science should occupy in American education. The fundamental purpose of education should be examined anew, for the coming generation will live in a quite different world than that which has heretofore existed. We are now engaged in winning a war by the use of science and its applications. But the science that is winning the war is fundamentally the marvelous science and technology of the relatively few. A large fraction of the men taken into our services made a sorry showing when their knowledge of the most elementary science was tested. Presumably if science is a valuable way of life, as well as the foundation for technology, a real comprehension of it as a way of thinking and acting by the many will be as important for the future as the expertness of the few has been during the war.

It is likely that the technological applications of science will be over-emphasized for a few years. In fact, it is doubtful whether there is any more mental discipline in servicing and operating a machine whose basic scientific principles are only dimly understood than there is in feeding and milking a cow whose dietary requirements and physiology are also dimly understood. The radio makes wonderful use of electromagnetic waves, but the manipulation of its dials gives no better appreciation of the beauty of Maxwell's theoretical work than the alphabet does of the grandeur of Shakespeare's plays. If the new society searchingly examines and elucidates the differences between science as mental attitudes and technology as processes, and organizes education so that each shall play its proper role in preparing the widely varying members of the rising generation for this new world science has made, it will have achieved as great a success as winning a war.

Dr. Johnson states that the new society will meet with the Association at its annual meetings, and with the National Education Association at its summer meetings. There is much to commend

this double connection, for the meetings with the Association might be concerned primarily with fundamental problems of educational policy, such as those just mentioned, while those with the National Education Association might be devoted more largely to methods of putting them into effect. Far-seeing scientists have long realized that science should be taught better and have organized many programs on the subject. And they have often considered, sometimes with anxiety, the role science is playing in education. Each group, those who are primarily scientists and those who are primarily educators, should realize that it is composed of partisans, and then in a spirit of cooperation undertake to set a pattern of education of a higher order of excellence than has yet been dreamed of. Naturally it will be no more closely the same for every boy and girl than are their athletic and other activities. This has become a complex economic world; it will consequently be an equally complex educational world. To ignore either is to invite disaster.

Early Environment of Eminent Scientists

There is a general impression that a large percentage of eminent scientists have had unfavorable educational environments in their early youth, and the impression may be correct. The subject has human interest because a boy is regarded as a hero who overcomes difficulties and achieves distinction. If the facts were thoroughly investigated they might be of great interest and importance because of the light they would throw on the whole problem of education. Or it might become clear on investigation that the factors which contribute to success in science are so numerous and uncertain that they cannot be determined. At any rate, a thorough examination of the educational antecedents of scientists would be interesting.

Men who have achieved high success in nearly every field have also come from the farms and villages of this country. Statesmen have often boasted of their humble origin. Captains of industry have often risen from poverty and military leaders from obscurity. A recent advertisement states that every one of the presidents of the 18 operating companies of the Bell Telephone System began work as a clerk or in some other lowly position at a salary ranging from 25 to 65 dollars a month. These successes evidently were not due to educational opportunities or to the lack of them. What factors, internal and external, are conducive to exceptional achievements?

Genetics Society of America

The Genetics Society of America is a direct outgrowth of the Joint Genetics Sections of the American Society of Zoologists and the Botanical Society of America. The Joint Genetics Sections were organized in December 1921, following the Toronto meeting of the A.A.A.S. and its affiliated societies. The Sections had an Executive Committee made up of a Chairman, chosen on alternate years from the Zoological Section and from the Botanical Section, a Secretary-Treasurer, chosen from either Section, and a Society Representative, chosen from the Section other than that from which the Secretary-Treasurer was chosen. The Sections had representatives on the Board of Control of *Botanical Abstracts* and on the Editorial Board of the *Journal of Heredity*.

The *Proceedings* of the American Society of Zoologists and abstracts of papers presented at meetings of the Sections had been published in the *Anatomical Record*. After the organization of the Joint Sections, abstracts of the botanical, as well as the zoological, papers were included.

As it became apparent that several geneticists who were not members of either of the parent societies desired to become affiliated with the group, methods were gradually developed whereby they might do so. At the Nashville meeting, in 1927, a committee was appointed to consider the type of organization which would best serve the needs of American geneticists. This committee, and other subsequently appointed, made progress reports at the New York, Des Moines, and Cleveland meetings. As a result of the study made, it was resolved at the New Orleans meeting in 1931:

1. That the Joint Genetics Sections be reorganized as an independent society.
2. That the officers elected at the New Orleans meeting be the officers of the new society for 1932.
3. That all outstanding accounts of the Joint Sections be assumed by the new society.
4. That the Secretary inform the members of the "Geneticists Interested in Agriculture" concerning the organization of the new society, and extend to them a cordial invitation to apply for membership.

A Constitution and Bylaws were adopted, which after certain minor changes became the Constitution and Bylaws of the new society.

The Genetics Society became affiliated with Sections F (Zoological Sciences) and G (Botanical Sciences) of the A.A.A.S., in May 1932, and thereby acquired representation on the council of the Association. The Society was assigned membership in Group VI of the Division of Biology and Agriculture of the National Research Council, with representation in the Division rotating among the Genetics Society, The American Genetics Association and the Ecological Society of America, the three organizations which compose Group VI.

The arrangement with the Wistar Institute whereby the Programs, Abstracts and Proceedings of the Joint Sections were published in the *Anatomical Record*

was discontinued, and an arrangement was made with *The American Naturalist* to publish the Abstracts and to distribute them to the members as preprints along with the program before each annual meeting. Beginning in 1937 this was discontinued and a similar arrangement was made with the editor of *Genetics*, so that in recent years the complete set of abstracts of papers presented at the annual meeting has appeared in the January issue of *Genetics*. These same abstracts are preprinted without charge of paging in the *Records* of the Society and are available to the members before the meetings.

The first annual meeting of the Society was at Atlantic City in December, 1932. Since then midwinter meetings have been held in conjunction with the sessions of the A.A.A.S.; there was also a branch meeting in December, 1935, at Princeton. The Society has conducted a series of summer meetings, the first of which was held on the campus of the University of California at Berkeley in June, 1934. In succeeding years these meetings were held at the Marine Biological Laboratory, Woods Hole, Mass., in Ottawa, Canada, and at the laboratories of the Carnegie Institution of Washington and the Long Island Biological Association, Cold Spring Harbor, N. Y. In 1939 the summer meeting was omitted, so that the members could participate in the International Congress of Genetics held in Edinburgh. The 1942 summer session was also canceled, since the Executive Committee of the Society wished to avoid the transportation difficulties associated with the war program.

In the period before the war, an attempt was made to integrate the activities of the Society with those of similar societies in foreign countries, largely through the efforts of M. Demerec who was then Secretary of the Society. Contacts established at that time with societies in Great Britain, Germany, Holland, Sweden, Russia, Rumania and Japan have been suspended as a result of the war.

The dues of the Society merely cover the expenses of operation; no officer receives any remuneration for his services. Of the $1.50 collected annually from each member, about one-third represents a contribution toward the support of Biological Abstracts.

The number of members has increased steadily since the Society was organized, although an appreciable drop is now to be anticipated, since many of the younger members in the national services have severed their university and scientific connections. Total membership for the past ten years is as follows: 1933, 338; 1934, 375; 1935, 403; 1936, 418; 1937, 451; 1938, 492; 1939, 483; 1940, 493; 1941, 538; 1942, 549.

Many of the statements presented above concerning the organization of the Society have been abstracted from an article, "History and Organization," prepared by a former Secretary, P. W. Whiting, and published in Records Numbers 2 and 3, in 1933 and 1934. Full details of the business of the Society, as well as programs of meetings and abstracts of papers presented will be found in the various issues of the Records.—B. P. KAUFMANN.

Membership in the Association

Eligibility for Membership

Membership in the Association is open to all persons engaged in scientific work, whether in the fields of the natural or the social sciences; to all amateur scientists, whatever their special interests; and to all who desire to follow the advances of science and its effects upon civilization. Members having made substantial contributions to the advancement of science are eligible for election as fellows.

Dues and Publications

Membership dues are $5 per year, including subscriptions for the monthly A.A.A.S. BULLETIN and either the weekly journal *Science*, now in its 99th volume, or *The Scientific Monthly*, now in its 58th volume. *Science* is a journal for professional scientists; the *Monthly* is a nontechnical journal for the intelligent public. The Association also publishes technical symposia and nontechnical books on science that are available for members at prices substantially below those to the public.

Organization and Meetings

The Association was founded in 1848, with an initial membership of 461. Papers in its early programs were classified as either natural philosophy or natural history. Now its work is organized under 16 sections and 189 associated societies having a total membership of over 500,000. Its annual meetings are the greatest regular gatherings of scientists in the world.

Nominations and Applications for Membership

Members may submit nominations for membership at any time, and persons desiring to become members can obtain membership application forms from the Office of the Permanent Secretary, the Smithsonian Institution Building, Washington 25, D. C.

Changes of Address

New addresses for the Association's record and for mailing the journals *Science* and *The Scientific Monthly*, as well as the A.A.A.S. BULLETIN, should be in the Office of the Permanent Secretary, Washington 25, D. C., at least two weeks in advance of the date when the change is to become effective.

Officers of the Association

President, Anton J. Carlson; *Permanent Secretary*, F. R. Moulton; *General Secretary*, Otis W. Caldwell; *Treasurer*, W. E. Wrather; *Director of Publications*, F. L. Campbell; *Assistant Secretary*, Sam Woodley.

Executive Committee: Burton E. Livingston, *Chairman;* Roger Adams, Joseph W. Barker, Otis W. Caldwell, Walter B. Cannon, Anton J. Carlson, Arthur H. Compton, Kirtley F. Mather, F. R. Moulton, Elvin C. Stakman, and W. E. Wrather.